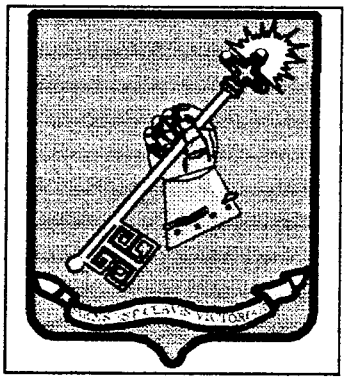
AIR SUPPORT FOR THE DIVISION DEEP BATTLE:

DOCTRINAL DISCONNECT

A Monograph
by

Major Robert D. Grymes
Field Artillery



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ABSTRACT

AIR SUPPORT FOR THE DIVISION DEEP BATTLE: DOCTRINAL DISCONNECT by MAJ Robert D. Grymes, USA, 55 pages.

This monograph discusses the linkage between air support and the division deep battle from 1982-1994. In 1982, the Army introduced battlefield air interdiction (BAI) as an important asset for the corps and division deep battle. After the Army published the 1986 version of FM 100-5, operational-level commanders assumed more control over BAI. Consequently, the division rarely received fixed-wing air support for its deep battle. The Joint Force Air Component Commander (JFACC) in Operation Desert Storm eliminated BAI and established only two categories of air support: close air support (CAS) and air interdiction (AI). Following the Gulf War, service and joint doctrine have abandoned the air support system that worked in the Gulf War and have reverted to the pre-war system without BAI.

The conclusions and recommendations fall into two categories: AI and CAS. First, AI was controlled by operational commanders to attack operational targets. The operational commander exercises complete authority over AI within his battlespace. Given the success of AI during Operation Desert Storm, AI doctrine works well now. However, the Army's doctrine relies too heavily on AI for the division deep battle. Army division doctrine requires revision. Divisions cannot reasonably expect AI sorties.

Second, CAS requires significant revision. Since Operation Desert Storm ended, Army and Air Force doctrine have yet to include new employment concepts for CAS. The concept that was executed in the Gulf War represents the way of the future. CAS that extends to the limits of the division deep battle provides responsive support within the division commander's battlespace.

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> A soldier . . . in peacetime is like a sailor navigating by dead reckoning. You have left the terra firma of the last war and are extrapolating from the experiences of that war. The greater the distance from the last war, the greater become the chances of error in this extrapolation. Occasionally there is a break in the clouds: a small-scale conflict occurs somewhere and gives you a "fix" by showing whether certain weapons and techniques are effective or not; but it is always a doubtful fix.[1]
>
> Michael Howard, "Military Science in an Age of Peace"

Part I: Introduction

In the aftermath of the Gulf War, the United States armed forces finds itself "extrapolating" to remain focused on what success in the next war requires and how the military should prepare for it. Other factors such as the fall of the Berlin Wall, the disintegration of the Soviet empire, and the reduction of the U.S. armed forces also shape the doctrinal debate. Since the Gulf War, the Army and the Air Force have revised battlefield air support doctrine. Primarily, the services differ over deep battle responsibilities beyond the fire support coordination line (FSCL). This debate, in particular, threatens to overshadow air support issues that exist short of the FSCL. While Army doctrine has consistently maintained a requirement for air support within the FSCL, service and joint doctrine have incompletely addressed how to employ it.

The Army has emphasized air support's critical role in the deep battle in the last three editions of FM 100-5, Operations.[2] From 1982-1990, Army doctrine defined two forms of tactical air operations in support of Army divisions: close air support (CAS) and air interdiction (AI). Battlefield air interdiction (BAI) comprised a subset within the category of AI. From the Army's viewpoint, air power, with its capability to mass quickly, to employ a variety of munitions, and to

achieve lethal effects, was seen as a major component of the corps and the division deep fight.

During that same period, 1982-1990, the Air Force considered air interdiction as an operational asset under the control of the joint force air component commander (JFACC).[3] In Air Force eyes, battlefield air interdiction was only a small fraction of the overall air interdiction effort. The Air Force, adhering to its doctrine, seldom allocated air assets to the division deep battle. Army and corps commanders, in turn, usurped any authority that division commander might have had by closely controlling what little BAI had been allocated.

Operation Desert Storm provided a battlefield laboratory that tested service and joint doctrine. Air power in Operation Desert Storm was centralized under the control of the JFACC. Neither the joint force commander (JFC), nor the JFACC, allocated aircraft for BAI during the Gulf War, despite BAI's established place in Army, Air Force, joint, and NATO doctrine. The JFC for Desert Storm granted the JFACC considerable latitude to execute strategic attack and air interdiction. Army corps and division commanders adapted to an expedient air support system that did not include BAI. However, CAS was expanded to cover the entire area short of the fire support coordination line (FSCL) and, therefore, blanketed the space formerly designed for BAI. Army corps and division commanders found themselves grappling with how to employ CAS throughout their battlespace to influence the deep battle. Although this system departed from established doctrine, it, nevertheless, worked well.

Because the procedures for directing air power departed dramatically from the established doctrine, the operational lessons of the Gulf War are not clear. Joint and service doctrine no longer

discusses battlefield air interdiction. Since ground forces can no longer depend on BAI, air power in support of the division deep battle lacks doctrinal support. Alternatively, CAS has returned to its pre-Gulf War definition. Apparently, Army and Air Force doctrine have overlooked the experience of Desert Storm and have failed to incorporate an expanded deep attack role for CAS. CAS continues to be an asset for the division close battle. The new doctrine appears to diminish the division's control of air power. Post-Gulf War doctrine clearly reduces the role of air power in the division's battle and may underestimate the importance of air power in the success of a division's fight.

This monograph is a search to determine whether the gaps in current doctrine are a serious shortcoming. The evolution of air power in each of the doctrinal revisions between 1982-1990 provides a clear path to explore each service's attempt to design techniques appropriate for the conduct of the next war. The operational expedients developed during Operation Desert Storm may serve to show how that war departed from the anticipated practice and, perhaps, reveals operational aspects not recognized previously.

However, before it is possible to examine the operational and doctrinal history, it is necessary to establish a base concept by which the doctrinal shifts can be assessed. A prerequisite for an effective division deep fight is a functioning fire support system. Joint Pub 3-09, Doctrine for Joint Fire Support (Final Draft) presents the guidelines for an effective fire support system. This joint publication specifies that the Joint Force Commander (JFC) "must establish policies and procedures that--facilitate unity of effort, ensure the efficient and effective use of intelligence, [and] enhance the timely and

effective engagement of targets."[4] Similarly, if the division is to wage a successful deep attack, the division commander must also establish a capable fire support system.

The division's fire support system impacts on the effectiveness of all deep attack means to include air support. Thus, the division deep battle requires unity of effort, intelligence support, and target engagement. First, unity of effort is maximized when aircraft respond to the division commander's decisions. Second, intelligence support is optimized when it is available for timely decision-making. Finally, target engagement is optimal when air support and the suppression of enemy air defense (SEAD) are integrated with maneuver and other fire support assets, and coordinated with other airspace users. The fire support system, which depends on this three-dimensional capability, determines the division's success or failure with deep air attacks.

In each of the three distinct time periods evaluated in this monograph, the three dimensions of the fire support system define deep battle effectiveness. Unity of effort, intelligence support, and target engagement serve as criteria to evaluate not only doctrine from 1982-1994 but also point to potential solutions for future battlefield require-ments. It must be noted that doctrinal solutions require Army and Air Force cooperation and, hence, involve a detailed understanding of both services' operational needs.

Part II: The Evolution of Air Support (1982-1990)

From 1982-1990, Army and Air Force doctrine integrated air support into the corps and division deep battle. The first publication,

FM 100-5 (1982), introduced the AirLand Battle and served as the stimulus for three subsequent documents in 1984: the "31 Initiatives"; U.S. Readiness Command Pamphlet 525-8, General Operating Procedures for Joint Attack of the Second Echelon (J-SAK); and Air Force Manual 1-1, Basic Aerospace of the United States Air Force.[5] These three documents essentially adopted army concepts and included them in air force and joint doctrine. The next publication, FM 100-5 (1986), expanded the army and corps roles in deep operations and reduced the importance of the division in the 1982 version. The final publication, FM 71-100, Division Operations, described in detail the role of air support in the division deep battle, although it provided more connection with FM 100-5 (1982) than the 1986 edition. The evolution of air support from 1982 to 1990 led to inflated expectations of air support for the division deep battle in the upcoming Gulf War.

The evolution began with Operations (1982) and became known as the "AirLand Battle." In effect, this document established the deep battle requirements for all of the army's command echelons and the role air power would play against a Soviet threat. The manual specified that "the numerical superiority of Soviet follow-on echelons, not the type of operational maneuver the Soviets might employ" was the driving factor requiring the deep battle.[6] To prevent the Soviet numerical superiority from coming to bear in the close battle, the 1982 doctrine focused on attacking deep. The basic AirLand Battle tenet of depth expresses the deep battle requirement:

> The battle in depth should delay, disrupt, or destroy the enemy's uncommitted forces and isolate his committed forces so that they may be destroyed. The deep battle is closely linked with the close-in fight. All involved weapons, units, and surveillance assets must contribute to the commander's overall objective. When

> we fight an echeloned enemy, such operations may be vital to success.[7]

The manual deemed offensive air support (CAS, BAI, and tactical air reconnaissance) critical in both offensive and defensive operations.[8]

Close air support and BAI were defined by identifying the conditions and responsibilities for employment: proximity of friendly forces; control and coordination in planning and execution; and intelligence and target acquisition responsibilities. CAS was defined as:

> . . . air action against hostile targets near friendly forces. CAS complements and reinforces ground fire. Each air mission must be integrated with the ground commander's fire and maneuver scheme. This means that aircraft are under either positive or procedural control.[9]

In contrast, BAI was defined as:

> . . . air action against hostile surface targets nominated by the ground commander and in direct support of ground operations. It is the primary means of fighting the deep battle at extended ranges. BAI isolates enemy forces by preventing their reinforcement and resupply and by restricting their freedom of maneuver. It also destroys, delays, or disrupts follow-on enemy units before they can enter the close battle. BAI missions may be planned against targets on either side of the FSCL in the ground commander's area of influence. Missions short of the FSCL require close coordination with ground units.[10]

Close air support and BAI specified where and how the army used air support. First, CAS struck targets in close proximity to ground forces and was under the control of the supported ground commander. BAI struck targets beyond the range of CAS on either side of the FSCL. The ground commander selected the targets for BAI but did not control the air operation. Second, the ground commander was responsible for acquiring the targets for CAS while BAI target detection and acquisition was a joint responsibility. Among army units, the corps possessed the preponderance of the intelligence collection assets and was responsible for distributing intelligence.[11] Third, CAS required detailed

coordination and included integration with other fire support assets, suppression of enemy air defense, and airspace clearance. Coordination for BAI short of the FSCL required the same degree of detailed coordination, but CAS was easier to coordinate than BAI, because CAS was coordinated and executed under ground commander control. Thus, the definitions of BAI and CAS specified where offensive air support occurred on the battlefield.

However, offensive air support for the division deep battle was only available through battlefield air interdiction. By definition, close air support supported division forces (committed brigades) in close proximity to the enemy targets. As a tool to shape the battlefield, battlefield air interdiction remained primarily a corps asset because the corps was organized to integrate deep attacks, to manage and track intelligence, and to control attack timing.

Concurrently with corps planning, the Air Force planned the air tasking order (ATO). The air tasking order cycle paralleled corps planning more than division planning. Corps and divisions planned using enemy closure windows based on areas of influence and areas of interest. Naturally, corps planning times exceed those of the division. The corps could align its 72-hour considerations for area of influence and its 96-hour considerations for area of interest more closely with the 72-hour air tasking order (ATO) cycle. Using a shorter cycle than a corps, the division planning cycle considered a 24-hour cycle for its area of influence and a 72-hour cycle for area of interest.[12] Although not yet formally approved in air force doctrine, the Army's conception of BAI greatly affected the evolving air force and joint doctrine.

Two years later in 1984, BAI gained widespread recognition with the commissioning of an Army-Air Force Joint Force Development Group study. The "31 Initiatives," as it came to be called, was a landmark document in terms of joint service cooperation. Richard Davis, author of The 31 Initiatives: A Study in Army-Air Force Cooperation, explained how cooperation between the Army and the Air Force increased at the operational level following the Vietnam War and fostered a cooperative army-air force dialogue in the early 1980s:

> Its aftermath [the end of the Vietnam War] of decreased funding and renewed interest in planning for potential conflict in central Europe led to more interest on the part of both services in avoiding duplication of effort and in joint operations in a large scale or high-intensity war situation. The Army's preeminent role in ground combat meant that the Air Force, in order to integrate its efforts into the overall scheme of the ground battle, would have to march to the beat of the Army's conceptions of how to fight the next battle.[13]

The Joint Force Development Group (JFDG) formed by Chief of Staff of the Army General John Wickham and Chief of the Air Force General Charles Gabriel met in this spirit of cooperation with the charter "to develop a means of designing and fielding the best affordable airland combat force which minimizes system duplication without jeopardizing force effectiveness."[14]

The JFDG produced Initiative #24, close air support, and Initiative #21, battlefield air interdiction. The JFDG considered air support throughout the battlefield's depth in a high intensity conventional warfare scenario. The CAS initiative simply reaffirmed the importance of air force close air support for the Army and in effect required no further action. More importantly, the BAI initiative formalized the concept of BAI in joint force doctrine and adopted verbatim the BAI definition from Operations (1982). Beyond the

definition, the two services "agreed to develop and to test procedures synchronizing BAI and ground maneuver . . . [which] would be flexible for use in any potential theater of war."[15] Six months after the approval of the "31 Initiatives," the services published General Operating Procedures for Joint Attack of Second Echelon (J-SAK) in December 1984.

The authors began the J-SAK with a definition of the second echelon that applied in any theater regardless of a Soviet-style threat. They defined the second echelon "as enemy ground military formations not directly engaged in the battle at the FLOT [forward line of troops] and positioned behind the forces in contact as a reserve force, a Soviet-style second echelon, operational maneuver group, or follow-on force."[16] Attacking the second echelon in the offense or defense applied to most armies, because they also employed in depth such lucrative assets such as reserves, artillery, and combat service support units.[17]

The J-SAK manual also established key responsibilities and established procedures for the BAI process. J-SAK specified responsibilities at all levels to include the Land Component Commander (LCC). The LCC approved and prioritized BAI nominations by the corps. The procedures were explicit:

> These targets are normally identified and prioritized through Army echelons from Divisions [and] Corps to the LCC . . . The LCC's target nominations are furnished to the TACC [tactical air control center] through the BCE [battlefield coordination element] for integration into the ATO. These BAI target nominations will be planned and attacked in the priority provided by the LCC, subject to the availability of air assets, and the myriad of operational factors considered by the ACC [air component commander] (e.g., weather, target area defenses, etc.).[18]

Echoing FM 100-5 (1982), J-SAK identified corps as the level at which the BAI process was to achieve its intended purpose. The Army lacked a

significant deep battle capability in 1984; corps commanders considered BAI to be a critical asset in shaping the battlefield. J-SAK recognized this fact as well by stating that "corps second echelon targets are attacked primarily by tactical air."[19]

In contrast, J-SAK did not provide the division any significant tactical air capability for its deep fight. Divisions nominated targets for inclusion with the corps BAI nominations. The corps took its nominations and the division nominations and ranked the entire list before submitting it to the land component commander (LCC). The LCC then approved BAI nominations based on the army and corps deep battle objectives. The LCC decided the order in which BAI attacked the nominated targets. The nomination process generated operational level targets. However, army and corps concern were given a first priority. Division targets, always tactical in nature, would only be approved in a review process presided over by an operational level commander, the LCC. The J-SAK concept, therefore, expected divisions to fight predominately with their own deep assets and to request support from the corps if needed.[20] The division could not depend on BAI for its deep battle.

The final document published in 1984, AFM 1-1, Basic Aerospace Doctrine of the United States Air Force, was developed concurrently with the "31 Initiatives." This manual incorporated BAI as a subset of air interdiction and distinguished between the two as follows:

> Air interdiction attacks against targets which are in a position to have a near term effect on friendly land forces are referred to as battlefield air interdiction. The primary difference between battlefield air interdiction and the remainder of the air interdiction effort is the level of interest and emphasis the land commander places on the process of identifying, selecting and attacking certain targets. Therefore, battlefield air interdiction is controlled and executed by the air commander as an integral part of a total air interdiction campaign.[21]

Although the Air Force supported the BAI concept, BAI remained firmly within the air commander's control. Similar to the J-SAK procedures, the Tactical Air Control Center (TACC) in consultation with the BCE, directed air interdiction and BAI to support the main effort of a particular corps, a division, or other unit. From its theater level-perspective, the Air Force, using its C3I network, would centrally control and rapidly mass its assets at the decisive point. This approach failed to assure a predetermined number of BAI sorties for the corps commander, but did ensure that a designated ground effort was weighted with air power as the main effort.[22] Conceptually, the Air Force interdicted lines of communication as well as approaching enemy forces. Historically, the Air Force focused on lines of communication rather than on hard-to-find, moving enemy formations. By incorporating attacks on enemy forces using BAI, the Air Force deviated from its traditional emphasis on lines of communications.[23] In so doing, the Army would receive more responsive support for its deep battle.

Establishing BAI in Army, Air Force, and joint doctrine constituted only a first step in developing an asset for the division deep battle. The key to the entire process lay with the Joint Force Commander (JFC) and the apportionment decision. To describe the process briefly, the Joint Force Air Component Commander (JFACC) recommended a percentage of BAI from the total sorties available for AI. The recommendation could be developed in one of two ways: (1) the JFACC and the LCC negotiate the percentage of AI dedicated to BAI and submit the agreement for JFC approval; or, (2) the JFC would establish the proportion of the AI to be set aside for BAI. Remembering the J-SAK procedures specified earlier, the land component commander only decided

the prioritization, approval, and attack timing of BAI nominations. All other nominations constituted AI nominations that were subject to the prioritization and approval of the JFACC who is in charge of the JFC's interdiction effort. If the BAI apportionment was small, then the LCC must make difficult choices about whether to direct limited BAI assets for army-level targets or to delegate the employment responsibilities, and the air power assets, to one or more corps.[24]

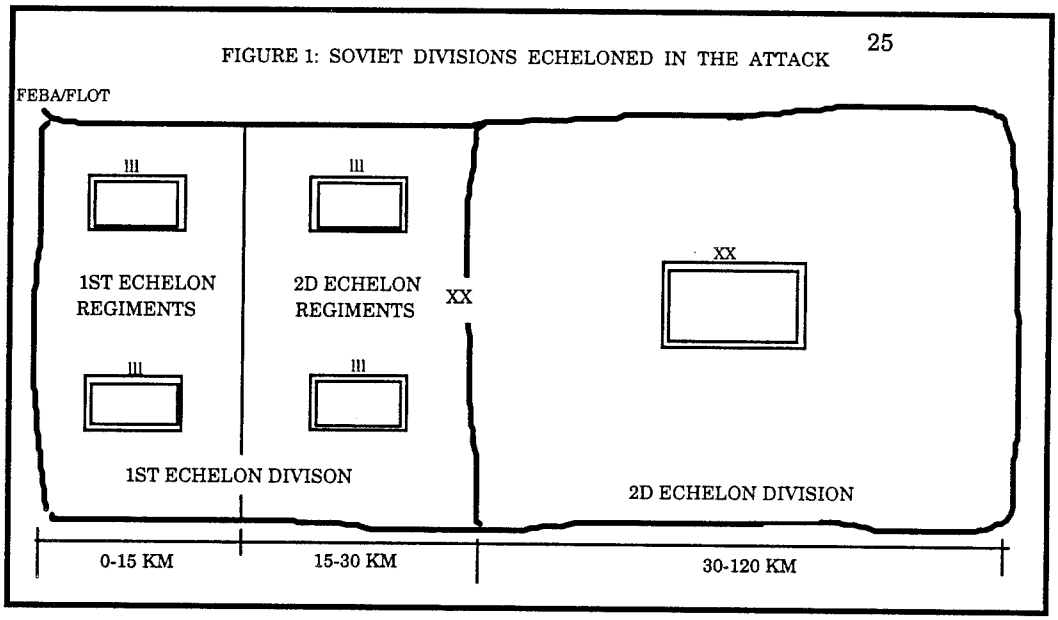


FIGURE 1: SOVIET DIVISIONS ECHELONED IN THE ATTACK [25]

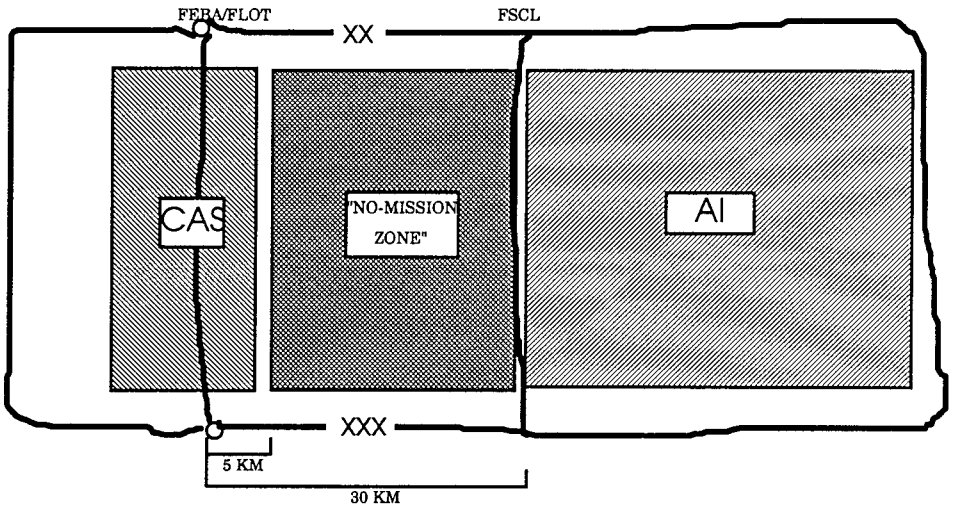
The implications for the division deep battle were significant. First, BAI was essentially not available for divisions, because the nomination process required the LCC to evaluate corps targets (second echelon divisions) and not division targets (second echelon regiments of first echelon divisions). (See Figure 1 above.) Second, if the corps did receive BAI sorties, the corps had to make difficult decisions as well. If the corps used the assets for corps-developed targets, then the division could not receive any assets for its deep battle. Thus, within thirty kilometers of the FLOT, no BAI remained to attack the

second echelon regiments of the first echelon divisions. Typically, Army divisions focused on this target set.

Without BAI, this situation equates to what Lieutenant General Merrill A. McPeak, in 1985, called the "no-mission zone." General McPeak elaborated further:

> In the area between about five kilometers from the FLOT [forward line of troops] out to the FSCL, we would not do close air support, because the targets are not in "close proximity" to friendly forces, and we would not do AI, because the targets are inside the FSCL. There is "no mission" that applies in the zone where attacks must be coordinated but need not be integrated.[26]

FIGURE 2: AI, CAS, and the "NO-MISSION ZONE"



General McPeak wanted to avoid the creation of the "no mission zone." McPeak believed that "there is no reason not to fly properly coordinated interdiction missions inside the FSCL."[27] He sought to employ air power *throughout the depth* of the battlefield to achieve coordinated and decisive effects in conjunction with ground forces.

The third implication affecting the division's deep battle was the intelligence-gathering assets of corps or higher echelons. In army channels, the division depends on the corps to distribute intelligence

in order to plan, track, and execute BAI against division-nominated targets. Because of the time-sensitive nature of deep targets, the corps would have to dedicate assets to the division to achieve a successful attack. The Air Force's tactical air control center (TACC) accessed national- and theater-level systems and was likely to have more accurate and timely intelligence than the division could obtain from corps sources.[28] When the planning cycle is considered, it is obvious that the Air Force began developing the 72-hour air tasking order before the division could decide exactly what it wanted to attack in the next 24-48 hours. The division worked at a disadvantage, because its intelligence cycle was typically behind the corps and air force cycles.

The next major development in the evolution of BAI occurred with the publication of Operations (1986). This document elaborated on the key aspects of deep battle from the 1982 version. Fighting throughout the depth of the battlefield shaped the battlefield for the future success in the close battle. Deep operations at all echelons strove to deny enemy commander's freedom of action and to disrupt his formations and the tempo of his operations.[29]

The Army, with the publication of the 1986 manual, expanded its interest in and honed its application of the operational art. Deep battles occurred not only at the tactical corps and division levels as specified in the 1982 manual but also at army and theater level. Army-level and land component commanders (LCC) were warfighters now using all available assets as described below:

> In conjunction with air and naval operations, they employ maneuver, fires, and special operations to attack enemy units, facilities, and communications throughout the theater and to force the enemy to fight battles on their terms.[30]

As this passage indicated, Army-level commanders fought with all available assets and would employ battlefield air interdiction, for it was the only fixed-wing air asset that they he could prioritize and approve for deep attack.[30] Hence, the evolution of BAI made it, for all intents and purposes, an army-level asset.

By 1989 in Europe, BAI was an army-level asset. NATO allocated BAI sorties to the corps using the same system as for preplanned CAS. This differed from strictly U.S. procedures in that a U.S. corps had to nominate their BAI targets to the army commander for approval. In NATO, the army allocated BAI sorties for the corps' exclusive use; thereafter, the corps employed them independently and as general assets on targets of its own choosing.[32] Conceptually, this procedure gave a predetermined number of sorties to the corps commander and allowed a responsive system for the attack of the corps (or division-nominated) deep targets by fixed-wing aircraft. Although the NATO system differed from U.S. procedures, NATO procedures were more generous than U.S. procedures and provided more sorties for exclusive use by the corps.

However, in command post exercises in Europe, the CENTAG (Central Army Group) commander centralized control of his BAI assets. Operations (1986) predicted this development in that it noted scarce deep attack assets would only be available for attack against selective high payoff targets.[33] In practice, the "COMCENTAG [Commander, CENTAG] allocated [BAI] sorties according to his own priorities" because there were so few assets to apply against numerous corps and division requests.[34] In effect, the COMCENTAG made two decisions: an allocation decision and a control decision. The following paragraph summarized the process:

> Almost all AI target selection is done at the army group headquarters, and almost all BAI target selection is done at corps. But COMCENTAG prioritizes BAI targets across corps/army group boundaries and keep the relevant corps informed of these priorities. . . . The important point, in which CENTAG behavior differs . . . may be further clarified by considering the distinction between the allocation decision, made by COMCENTAG, and a control decision. The allocation decision assigns assets to a given echelon or grants them to subordinate echelons; that is part of COMCENTAG's doctrinal responsibilities. The control decision, however, involves planning exactly how the mission will be implemented.[35]

Thus, the COMCENTAG judiciously allocated BAI against corps-nominated targets and strictly controlled how the corps employed those scarce assets. These centralized procedures completed the joint evolution of BAI. BAI was either used to attack army-level targets or to weight corps operations. In effect, the division was excluded from employing BAI in its deep battle. Unfortunately, the Army continued to develop doctrine for division operations that did not reflect the growing practice of centralizing targeting at higher level headquarters.

Contrary to this trend, the army doctrinal publications in 1989-90 described a cohesive and refined concept for the deep battle. The foremost divisional publication, FM 71-100, Division Operations (1990) emphasized that

> division deep operations are conducted against the enemy's *uncommitted* forces or resources to prevent him from using them where and when he wants to on the battlefield. Division deep operations are not a function of depth, but a function of what forces are being attacked and the concept of operation.[36]

Descriptions of deep attack in offensive and defensive operations used diverse combinations of lethal assets to include "ground maneuver units, field artillery, battlefield air interdiction, attack helicopter units, air assault forces, airborne forces, and electronic warfare assets." Despite the plethora of deep attack assets, a heavy division did not typically employ ground maneuver, air assault, or airborne forces for *its* deep battle. In keeping with the division's primary focus to win

the close battle, the deep battle became an economy of force effort using fires and command, control and communications countermeasures (C3CM).[37] BAI was a significant element in this economy of force effort along with long-range artillery fires and electronic warfare operations.

Divisions expected in some situations to receive BAI. The following quotations from FM 71-100, Division Operations described how divisions depended on BAI as a deep battle asset for fires:

> BAI is keyed to the division commander's concept of operation. Tactical air force BAI coupled with division long-range artillery fires is one means by which the division commander conducts deep operations . . . Normally the division can expect to receive BAI if it is conducting the main effort or facing the threat main avenue of approach.[38]

> CAS and BAI support are integrated and synchronized with organic and attached fire support assets available to the division. . . . CAS and BAI are included in the commander's fire support plan. . . . Division BAI target nominations or mission-type air requests will receive appropriate priority by corps and EAC commanders.[39]

> To support division close and deep operations, CAS and BAI, as appropriate, should be directed to assist in interdicting enemy reserves (battalion or regimental-sized counterattack forces) in the division's zone of action.[40]

The division anticipated an integrated battlefield in which air support could play a role in deep, close, and rear operations. CAS provided tactical air support to targets in close proximity to friendly forces. BAI, in order to ensure the success of the close fight, attacked second echelon regiments of first echelon divisions and later shifted to first echelon regiments of second echelon divisions. Division Operations (1990) inaccurately represented BAI as a means to influence the division deep battle.

By 1990, BAI was no longer available for division operations. First, BAI had become the tool of the army and corps commanders; division doctrine did not reflect the evolution of BAI that had occurred since 1984. As a result, the division had to fight its deep attack

without BAI. Second, the division lacked the intelligence-gathering assets to integrate fully any BAI it received from higher. Corps remained the focal point for intelligence, and division depended upon corps for distribution. Neither the corps nor the division could deliver intelligence as accurately or as timely as the Air Force's TACC.

Despite the division's difficulties without BAI or adequate intelligence, the division did possess the means to coordinate air assets with other assets, employ SEAD, and clear airspace. When coupled with attack helicopters and long-range artillery, BAI offered the potential to attack the enemy in depth. The Air Force employed BAI in strike packages with the capability to conduct SEAD for itself. The division's artillery systems could handle any additional SEAD requirements for the Air Force. Finally, the division's army airspace command and control (A2C2) cell could easily clear airspace in the division area for BAI strikes. However, without access to the aircraft and intelligence, this integration and coordination did not aid the division deep fight. To be successful in the next war, the division needed all three components: aircraft availability, intelligence support and acquisition, and integration and coordination.

On the eve of the Gulf War, BAI doctrine provided fixed-wing air support for army and corps deep operations. The JFC and the JFACC controlled the air interdiction concept to include the percentage of AI apportioned as BAI. BAI served the Land Component Commander (LCC) with a scarce air support asset with which to conduct deep attack and to weight the main corps effort. In combat, however, air support would develop differently than expected by army and corps commanders.

Part III: Air Support in Operation Desert Shield/Desert Storm (1990-1991)

Operation Desert Storm presented an opportunity in combat for the army and air force to test air support for deep operations. However, during the Gulf War, the JFC and the JFACC overhauled the air support system: they eliminated BAI and expanded the scope of CAS. Lieutenant General Charles A. Horner, the JFACC for Operation Desert Shield/Storm, wanted to simplify the monumental control and coordination tasks associated with preparing a daily, 300-page air tasking order (ATO) directing the operations of more than 1,200 land-based fighter, attack, bomber, rotary-wing, and support aircraft.[41] As early as 9 September 1990, General Horner chose to limit offensive air support to two categories: close air support (CAS) and air interdiction (AI). Short of the FSCL, tactical air control parties (TACPs) cleared CAS sorties; beyond the FSCL, "interdiction sorties would be flown as part of an orchestrated effort directed by the Commander in Chief and implemented through the Joint Air Force Component Commander. . . ."[42]

There were several reasons why General Horner eliminated BAI. First, as has already been mentioned, Horner sought to simplify control and coordination in the area on the battlefield where ground forces and air forces operated together. This crowded area had the greatest potential for mishaps. In this area artillery and rocket fire posed a hazard to aircraft. Similarly, the Air Force feared fratricide incidents short of the FSCL, especially at night.

Second, air planners differed over how to employ air power. On the one hand, some planners advocated supporting land forces for defensive and offensive operations. In 1984, BAI had been a response to

a Soviet-type, echeloned attack in central Europe.[43] The situation in Kuwait was completely different from that of Europe's central front. The BAI concept, nevertheless, provided the capability and flexibility to attack any force arrayed in depth. Army commanders, therefore, expected BAI to work in any potential theater of operations.

On the other hand, other air planners focused on centralized and efficient employment of air power. These planners agreed with an air power theorist, Colonel John A. Warden III. Colonel Warden proposed priorities for the application of air power emphasizing air superiority, interdiction, and, finally, CAS. He contended that "historically, interdiction (both distant, intermediate, and close) had been far more productive [than CAS]." After air superiority was achieved, interdiction would take first priority, and if no interdiction targets remained, then air power could be applied to CAS.[44] In the spirit of Warden, air planners in September, 1990, decided to employ an air power-only option in the air operation's first phase against targets deep in Iraq. Subsequently, Coalition air forces would achieve air superiority (phase II), shape the battlefield (phase III), and operate in conjunction with ground forces (phase IV).[45]

After CENTAF air planners determined air power categories and the sequence of air operation, they established guidelines for air power employment in support of ground forces. The foremost concern of the corps and divisions were the procedures that allowed air power employment throughout the depths of the corps and division deep battle areas. BAI bridged the gap previously. (Refer to diagram on page 13.) A summary of these procedures follows:

> (a) close air support took place only short of the Fire Support Coordination Line and required "the supported ground commander's clearance . . . ;
>
> (b) air interdiction sorties tasking in the Air Tasking Order but without a "preplanned target" were to be directed to kill zones by ABCCC [airborne command and control center];
>
> (c) kill zones beyond the Fire Support Coordination Line were "assumed to be open unless closed by the TACC [Tactical Air Control Center . . .;" those short of the Line could only be opened by "the applicable land component force commander;"
>
> . . . . . .
>
> (e) preplanned close air support sorties whose targets were already struck were open to ABCCC direction into a kill zone; . . . [46]

These procedures supplemented the "push CAS" system and consolidated any unused sorties under the ABCCC for use against the JFACC's AI effort.

Short of the FSCL, Horner decided to use the "push" CAS. This method "pushed" CAS sorties forward in accordance with a predetermined rate of flow. The aircraft reported to the ABCCC and then to the requesting air liaison officers (ALOs) who were located at each corps' ASOC. The ASOCs would send CAS sorties to division ALOs and individual forward air controllers (FACs) to conduct traditional CAS in close proximity to ground units. For the division deep battle, corps and division ALOs, with ground commander approval, would activate "kill boxes" short of the FSCL. In the kill box, CAS sorties conducted autonomous attacks under procedural control.[47] If the ALOs had no targets, then the CAS missions would revert to interdiction missions under ABCCC control.[48]

Air interdiction planning and execution remained strictly centralized under General Schwartzkopf and General Horner. Predictably, the centralization of AI contributed to the trepidation of the corps and division commanders about shaping the battlefield adequately before the ground offensive began. Ground commanders had a limited role in

influencing air interdiction priorities.[49] Thus, air interdiction was a theater asset that was less responsive to immediate ground commanders. In execution, the Army had a difficult time nominating well-defined targets and tracking those targets after submission.

"CENTAF planners often found army target nominations out of date and of low priority." Therefore, air planners ignored outdated or unimportant targets and by the end of the war had attacked only fifteen percent (300 of 2000) of corps-nominated targets.[50] Ground commanders became increasingly frustrated with the rigidity of the nomination process and with their inability to integrate other assets, such as attack helicopters, with AI (or CAS) against escaping enemy armor entering southern Iraq (on 26-27 February 1991).[51] The centralization of targeting excluded ground commanders from AI.

To make matters worse, the enormous size of the ATO precluded daily dissemination. Divisions had difficulty coordinating and tracking the missions, because the division air liaison officers did not receive the ATO. Hence, divisions did not know if their nominated targets had been approved, and if they had, where and when aircraft were to fly in their division's area of operations.[52]

Nevertheless, air interdiction achieved superb results though not against division-nominated targets. Notable examples were the so-called the 52d Armored Brigade (the "go-away brigade") of the 52d Armored Division and the Republican Guard.[53] Inside the FSCL, however, the division attacked its targets using CAS.

In execution, CAS employment was a qualified success. By putting the aircraft in the air, the ground commanders' requests received responsive support.[54] The surplus of air power in theater favored the

"push CAS" system and provided on 24 February 1991 approximately 600 air force and marine CAS sorties (A-10s, AV-8Bs, and F/A-18s).[55] The airflow, up to 120 sorties per hour, made CAS available 5-10 minutes from the ABCCC's decision to send the assets.[56] CAS sorties on 24 February constituted seventy-eight percent of all combat sorties.[57] Excess sorties and the absence of enemy resistance, the speed of the ground advance, the extensive night operations, and the poor weather reduced the need for traditional CAS in close proximity to friendly forces and increased the likelihood of fratricide."[58] Subsequently, divisions enjoyed success when sending CAS sorties deep to engage alternative targets well out ahead of the ground advance.[59] There were three notable examples: the Battle of Al-Khafji on 30 January, the 1st Armored Division attack on 25 February, and the 24th Infantry Division (Mechanized) action on 27 February.

The first example of air support achieving decisive deep effects occurred on the night of 30 January 1991. Coalition aircraft decimated two Iraqi divisions during an eight-hour attack in what is now known as the battle of Al-Khafji. Tactical air strikes successfully engaged enemy forces because TR-1 reconnaissance aircraft, the Joint Surveillance Target Attack System (JSTARS), and Navy and Marine unmanned aerial vehicles (UAV) provided timely and accurately intelligence.[60]

In a second instance, on 25 February the 1st Armored Division employed CAS deep against the Iraqi 26th Infantry Division. The 1st Armored Division attacked in a sequence that brought success:

> With the division still about thirty-five to forty miles away from its objective, close air support strikes began, followed by attack helicopter strikes. As the division lead elements closed to about ten to fifteen miles, artillery, rocket launchers, and tactical missile batteries delivered [preparatory] fires. As the division lead elements came into visual range, psychological operations

> teams broadcast surrender appeals. If Iraqis fired on approaching Americans, the attackers repeated artillery, rocket, and missile strikes. In the experience of 1st Armored Division, that sequence was enough to gain the surrender of most enemy regular Army units in a given objective.[61]

Approaching Al-Busayyah later that day, the 1st Armored Division directed CAS and attack helicopters in a similar engagement sequence against an Iraqi brigade position.[62] The 1st Armored Division continued to engage targets deep with CAS as the first step in a sequential attack. The division never conducted simultaneous attacks with CAS, artillery, and attack helicopters because of the coordination difficulties involved.[63]

Lastly, the 24th Infantry Division (Mechanized) employed CAS deep on 27 February prior to seizing Tallil Airfield. As the 197th Brigade moved north towards battle position 101 (just south of the airfield), the division employed twenty-eight CAS sorties and artillery preparatory fires. The CAS maintained pressure on the Iraqi defenders until the brigade initiated its assault.[64]

Despite the success of these three operations, the JFACC's operational concepts placed several limitations on CAS. The "kill box," a thirty-by-thirty nautical mile box did not allow for simultaneous deep attack with other assets. The kill box designated as "active" connoted exclusive use by air force assets. Ground commanders were unable to direct which targets were engaged in the kill box.[65] Typically, the ABCCC or a "killer scout," an F-16 performing target confirmation within a designated kill box, identified the targets.[66]

Another limitation was the accuracy of aircraft delivery. Close air support sorties without precision-guided munitions (PGMs) were less accurate if ordnance was delivered from high altitude. CAS aircraft

operated at medium altitudes once enemy surface-to-air missile tracking radars were destroyed. Although other enemy air defense artillery (ADA) and infrared surface-to-air missiles (SAM) posed no danger to aircraft operating at 10,000 to 15,000 feet, the delivery from those altitudes resulted in a larger circular error probable (CEP). Ultimately, A-10s decreased their attack altitude to 4,000-7,000 feet and greatly improved their accuracy.[67]

Finally, the ABCCC diverted aircraft from unused CAS to AI against targets chosen by the ABCCC or a "killer scout." Only sixty-five percent of the A-10s, the primary air force CAS aircraft, dropped their ordnance supporting division operations.[68] Ground units had first priority on CAS sorties; if ALOs reported no close targets, then the ABCCC diverted those aircraft to attack AI targets. Ground commanders had little, if any, influence on the targets attacked by diverted aircraft. A better role would have been against deep CAS or AI targets supporting the division deep battle.

As has been shown, wartime practice differed significantly from pre-war doctrine. Foremost, the system adopted by the JFC and JFACC failed to follow doctrine for BAI and CAS. The JFACC abolished BAI and expanded the purview of CAS. In effect, the JFC and JFACC significantly altered doctrine by considering all targets short of the FSCL in the close proximity of friendly forces.[69] As a consequence, the definition of the FSCL also changed.

The FSCL became a dividing line between ground commander and JFACC authority. Corps commanders moved their FSCLs deeper to eliminate the need to coordinate deep Army aviation attacks or artillery strikes with the TACC. The FSCL virtually became a boundary between CAS and AI.

Moving the FSCL away from friendly forces extended the ground commanders' battlespace by increasing the depth that CAS ranged.[70] Thus, Army and Air Force commanders attempted to wrestle control of coordination authority from each other. Yet, the system adopted by the JFC and the JFACC worked relatively well. Joint doctrine and training before the war would have made the system work even better.

In contrast, the "push-CAS" system gave the division commander a flexible asset to use throughout the depth of the battlefield. Aircraft were readily available to attack targets of opportunity on a fluid battlefield. The "push-CAS" system overcame the inherent limitations of the air tasking order (ATO). The ATO was "ill-suited to targets that are fundamentally unpredictable, such as moving enemy ground forces." Accepting uncertainty, planners "pushed" CAS in direct support of ground forces or into "kill boxes.[71] The CAS aircraft supported the division's unity of effort through responsiveness, flexibility, and mass. The "push-CAS" technique restored the responsiveness of air power to division operations.

Another advantage seen in Operation Desert Storm was the improvement in targeting systems. The JSTARS and the UAV advanced intelligence-gathering for timely and accurate decisions. An Army-Air Force project developed JSTARS "to aid air-ground coordination in attacks against second echelon forces of the Warsaw Pact on the NATO front."[72] Each U.S. corps received one of the six ground station modules (GSM) deployed to the theater.[73] This critical downlink eventually became the cornerstone of situation and target development once the ground offensive became fluid.[74] As a result, the divisions relied on the corps to disseminate JSTARS-derived intelligence.

Ideally, the division would have its own GSMs for more rapid dissemination, but the corps still provided a great deal of valuable intelligence.

Equally as responsive as JSTARS, the unmanned aerial vehicle provided the corps a photo-reconnaissance capability. The Pioneer UAV flew forty-six sorties and provided timely situation development, target development, route reconnaissance, and battle damage assessment. The VII Corps linked the UAV sensor to artillery systems and established a sensor-to-shooter link used to engage targets rapidly.[75]

Without the intelligence-gathering systems such as JSTARS or the UAV, divisions coordinated timely and effective air attacks and avoided fratricide by dissecting the battlefield. The Army protected the Air Force by employing CAS beyond artillery and attack helicopter ranges. If used with the "kill box," aircraft enjoyed yet another degree of protection. Similarly, the Air Force protected the Army and avoided misidentification by only engaging targets not in close proximity with friendly ground forces. Army divisions generally chose to engage targets sequentially using different fire support assets instead of attacking targets simultaneously using two or more assets.

Coalition air power contributed significantly towards the Gulf War victory. Following the war, the services would subsequently reexamine the role of air power to glean applicable lessons. Amid claims of air power's decisiveness, the Army, Air Force, and the Joint Staff strove to capture the new reality.[76]

Part IV: Doctrinal Development (1991-1994)

Following the Gulf War in 1992, the Air Force rewrote its capstone doctrinal manual, AFM 1-1, Basic Aerospace Doctrine of the United States Air Force. Using the Operation Desert Storm design, the Air Force retained the categories of AI and CAS but eliminated battlefield air interdiction. Air interdiction's purpose remained "to destroy, delay, or disrupt existing enemy surface forces while they are far enough from friendly surface forces that detailed coordination of aerospace and surface activities is not needed. . . ."[77] Air Force doctrine defined the second category, close air support, as air power that "directly supports the surface commander by destroying or neutralizing enemy forces that are in close proximity to friendly forces."[78] AI and CAS definitions remained constant with pre-war usage. Battlefield air interdiction survived in NATO doctrine, yet there was no longer a definition identified in U.S. terminology.[79] Concurrently, joint doctrine emerged rapidly to refine and formalize air support issues.

Joint doctrine stresses the predominance of commanders within their designated areas of operations. In any area of the battlefield, the JFC designates commanders as "supported" or "supporting" commanders. As the supported commander, "land and naval operational force commanders . . . are responsible for the synchronization of maneuver, fires, and interdiction. To facilitate this synchronization, such commanders designate the target priority, effects and timing of interdiction operations within their AOs [areas of operation]."[80] Although supported commanders are responsible for all operations in their AO, supporting commanders need as much latitude as possible during planning and

execution. The differentiation between supported and supporting commanders also establishes where interdiction and joint fire support occur on the battlefield.

Consequently, joint doctrine establishes two categories of joint fires that directly support the JFC: interdiction and joint fire support.[81] Interdiction achieves primarily strategic and operational effects, and indirectly, tactical effects. For interdiction, the JFACC is the supported commander to ensure unity of effort for air power employment in achieving the JFC's objectives.[82] The JFACC controls interdiction as a theater asset; he also identifies and prioritizes interdiction targets. After analyzing each target, air planners determine the aircraft (number and type), weapons, aimpoints, target area threats, and other considerations. From this analysis, the JFACC's staff determines how many aircraft are needed to attack effectively interdiction targets.[83] The JFACC approves the allocation decision and retains the necessary aircraft to achieve the JFC's strategic and operational objectives first.[84] The JFACC, in accordance with the JFC's guidance, uses the remaining available aircraft for other functions such as joint fire support.

Joint fire support, on the other hand, affects the operational and tactical levels.[85] Joint Pub 3-09, Doctrine for Joint Fire Support further defines joint fire support as:

> . . . the fire of a supporting force against targets or objectives which are within or sufficiently near the area of operations of the supported force as to require detailed integration or coordination of the supporting action of the supporting force.[86]

This definition closely adheres to the previous definition of CAS which relied upon "close proximity" and "detailed integration." Therefore,

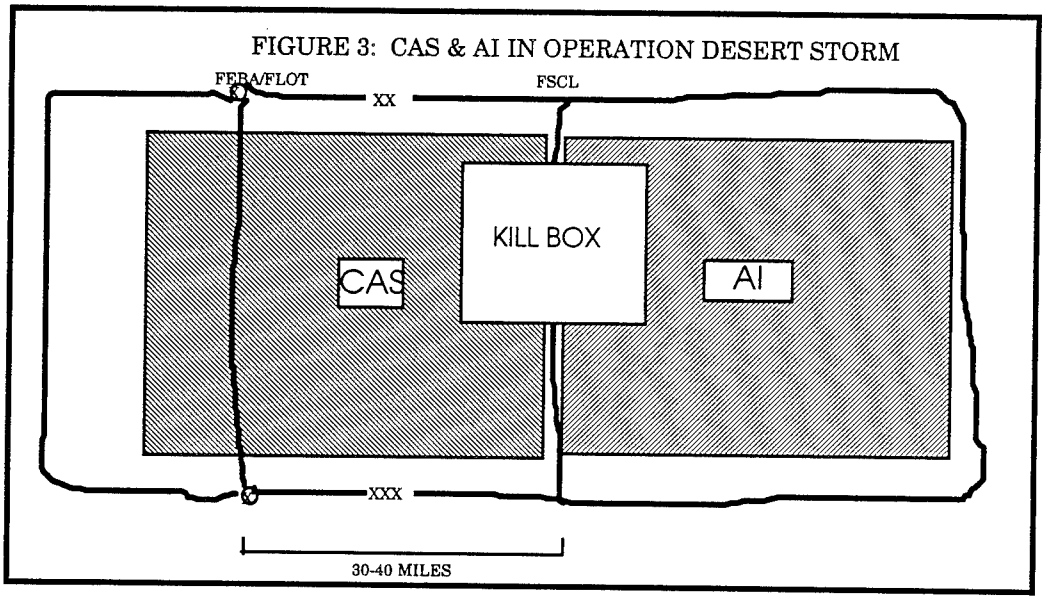
close air support falls into the category of joint fire support and is under the ASOC's supervision.

The ASOC at each corps headquarters remains the primary organization for planning, coordinating, and directing CAS in the corps area of operations.[87] By definition, the corps area of operations includes the division's deep, close, and rear operations. However, CAS employment in new joint doctrine does not adequately support the division's deep operations.

The joint manual for CAS, Joint Pub 3-09.3, Joint Tactics, Techniques, and Procedures for Close Air Support (First Draft), is not consistent with Joint Pub 3-09. Specifically, the manual's persistent and underlying theme is that CAS is to be used in close proximity to the FLOT and under a FAC's control. In the description of CAS employment, Joint Pub 3-09.3 states:

> like other assets, commanders can employ CAS throughout the depth of the battlefield . . . in each of the areas of operations; deep, close, and rear. CAS requires terminal control because it is integrated with the fire and maneuver of the supported force.[88]

FIGURE 3: CAS & AI IN OPERATION DESERT STORM



Terminal control by a forward air controller is required to prevent fratricide in close and rear operations. In deep operations, terminal control may not always be possible. Using the Operation Desert Storm examples, CAS operated at deep ranges (30-40 miles) in front of friendly forces which precluded terminal control from a forward air controller. (See figure 3 above.) To ensure the safety of air and ground elements, the ASOC used graphic procedures such as kill boxes and operational procedures such as "fast FACs."

The description of CAS for deep operations in Joint Pub 3-09.3 omits any discussion of independent fixed-wing operations. Instead, CAS supports deep operations,

> which may include special operations forces or conventional forces with a deep operational mission. CAS in support of forces conducting deep operations will normally be limited in scope and duration to supporting attacking maneuver forces or extracting unconventional forces.[89]

This concept clearly limits a division's use of fixed-wing air support. Taken literally, this description does not convey the possibility of a division massing its air support in depth on enemy forces moving through a designated area or a mobility corridor. Phrases such as "conventional forces with a deep operational mission" and "supporting attacking maneuver forces" suggest traditional CAS near the FLOT under a FAC's terminal control.

Joint Pub 3-09.3 also lists eight criteria for effective CAS. Of the eight criteria, two of those factors point specifically to traditional CAS. The eight criteria were:

1. air superiority;
2. SEAD;
3. target marking;
4. favorable weather;
5. prompt response;

6. aircrew and terminal controller skill;
7. appropriate ordnance;
8. communications.[90]

Target marking and aircrew and terminal controller skill also implied CAS operating under FAC clearance near friendly forces. Again, the doctrine specifies CAS for division close operations.

Despite these traditional and conservative examples, the capabilities of CAS espoused earlier in the Joint Pub 3-09.3 support a more extensive employment of CAS throughout the depth of the battlefield:

> The maneuver force commander uses CAS to attack the enemy in all weather conditions, day or night. . . . The inherent capabilities of aircraft, including speed, **range**, maneuverability, and the fact that they are operating in a third (aerial) dimension, allow them to attack targets that other supporting arms cannot engage because of factors such as target type, **range**, terrain, or the ground scheme of maneuver. [Underlining is the author's emphasis.][91]

Operation Desert Storm has changed the frame of reference for close air support. In the Gulf War, CAS capitalized on air power's extensive range to attack the enemy in depth. Joint Pub 3.09.3, Doctrine for Joint Tactics, Techniques, and Procedures for Close Air Support fails to incorporate that experience and does not present a consistent, more advanced concept of CAS applicable to the future battlefield.

In contrast, the U.S. Army's revised doctrine, FM 100-5 (1993), continues to emphasize fighting deep. First, at each echelon commanders fight deep by gaining information and attacking simultaneously throughout the depth of the battlefield. Conversely, the previous versions of FM 100-5 describe a sequential fight in depth. In FM 100-5 (1993), all available assets are needed to conduct the deep and close battles simultaneously. Simultaneous attack throughout the battlefield hastens the enemy's culmination and eventual defeat. At the tactical level, the manual directs commanders to :

> fight the enemy throughout the depth of his disposition with fires and with attacks on his flanks and rear. They attack committed and uncommitted forces and synchronize the attack of enemy artillery in depth with close operations. Such in-depth operations degrade the enemy's freedom of action, reduce his flexibility and endurance, and upset his plans and coordination. Most importantly, these operations prevent the enemy from impacting on friendly actions.[92]

FM 100-5 (1993) continues to stress, as the 1982 and 1986 versions did, attacking the enemy in depth throughout the battlespace.

Following publication of FM 100-5, the Army prepared the latest edition of the division manual, FM 71-100, Division Operations (Initial Draft) (15 July 1994). This manual describes a thorough integration of air support into the division's deep battle. Unfortunately, historical experience suggests that the division is unlikely to get the kind of support described in the manual.

As has been shown, the division rarely directs air interdiction, a theater asset under JFACC control. Prospects for AI in the division deep battle are remote, since strategic, operational, and even corps-nominated tactical targets usually take precedence over division targets. Nevertheless, the following excerpts from Division Operations (1994) suggest an overreliance on AI for division deep operations:

> AI is keyed to the division commander's overall operation. It is particularly important to the division's deep fight. . . AI missions, like any other fire support assets, are most effective when synchronized with the division commander's scheme of maneuver and his plan for simultaneous attacks throughout the depth of the enemy.[93]

The relationship between air interdiction and division deep operations in this passage is wrong. Air interdiction is keyed to the JFC's strategic and operational objectives. AI is not subordinated to division operations and thus cannot be synchronized with the division scheme of maneuver.

The next excerpt from Division Operations asserts that AI is to have a significant effect against the division's high payoff targets.

> CAS and AI should be primarily preplanned against enemy forces which the destruction or delay of will result in the greatest potential to unhinge the enemy commander's plan or operational tempo.[94]

If targets are designated as high payoff targets, then they are critical to the success of the division's plan. As critical targets, they must be attacked. However, the division has no guarantee that the JFACC will attack those tactical targets. The division has to dedicate other assets to attack its critical targets, because the probability of AI for the division is remote.

FM 71-100 (1994) fails to grasp the role of AI following the Gulf War. AI support is predicated on obtaining approval at corps, army, and air component levels of the division target set. Thus, AI is undependable and cannot be relied upon at the division to accomplish significant deep battle attack. Close air support, not AI, is the only air support asset that, once distributed, provides a guaranteed means to attack division-directed targets.

Nonetheless, close air support in Division Operations (1994) reflects the employment concept announced in the 1982 version of FM 100-5. An asset for the close operation, "close air support consists of air attacks against hostile surface forces which are in close proximity to friendly forces."[95] CAS normally supports brigades with the weight of effort to the brigade making the main attack.[96] Division Operations (1994) addresses the importance of AI for the deep fight but omits any specific use of CAS for the deep fight. Thus, a gap in air support coverage exists that closely parallels what General McPeak

called in 1985 the "no-mission zone." (See the diagram on page 13.) FM 100-5 and Division Operations (1994) comprehensively describe the deep battle requirements of the future battlefield. Army and Air Force conceptions of air power, on the other hand, uphold an antiquated CAS concept. Current doctrine precludes using air power in the division deep battle.

Despite the shortcomings of Division Operations (1994), it does see clearly the improvements in intelligence systems since the Gulf War. Improved capabilities provide timely and accurate intelligence for division operations. The ground station module (GSM), for example, links the division to JSTARS, the OV-1 Mohawk, and the unmanned aerial reconnaissance vehicle (UAV) and disseminates real-time intelligence more quickly than ever before. JSTARS offers the greatest potential because one aircraft's coverage "is sufficiently wide and deep to cover more than one corps, both close in and deep."[97] The Army plans to distribute two GSMs to each division tactical operations center (DTOC) and an additional GSM to the division artillery.[98] Thus, the division will then be able to track high-payoff targets in real-time. The outcome is better long range planning and execution for the deep battle.

The JSTARS's GSM linkage provides access to another proven system, the UAV. The UAV fills an intelligence collection void and places under corps control an organic and responsive asset. Additionally, the UAV gives the Army a reliable capability for battle damage assessment (BDA).[99]

Timely and accurate target acquisition by UAVs and JSTARS has the potential to improve air power employment for the division deep battle. Targets that are monitored by the UAV or JSTARS provide critical

intelligence for the commander's decisions. With advance notice, divisions plan in detail the required aircraft, engagement areas, attack timing, SEAD, and airspace clearance. By establishing an expeditious "sensor-to-shooter" linkage, SEAD fires are timely, and the aircraft attack at precisely the right moment. BDA by JSTARS or UAV identifies requirements for reattack or verifies the effects so that future plans continue on valid assessments. These new intelligence concepts, which are described briefly in Division Operations (1994), hold great promise for the division deep battle.

Doctrinal developments from 1991-1994 reflect several different interpretations of Operation Desert Storm's lessons. Air interdiction has been formalized in Air Force and joint doctrine as a theater asset under JFACC control. Meanwhile, the Army continues to propose air support employment throughout the depth of the tactical battlefield and relies on AI for the division deep battle. Close air support by the Air Force and the Army reverted to employment concepts drafted following the Vietnam War until the eve of the Gulf War. Close air support provides dedicated support only to the division close battle. CAS employment in the division deep battle, in similar design to Operation Desert Storm, does not appear in Air Force, Army, or joint doctrine.

Part V: Conclusions and Recommendations

In the aftermath of Operation Desert Storm, the military's leadership seeks to change joint and service doctrine in search of greater effectiveness. In light of air power's evolution since 1982, several conclusions about air power employment are in order. First, the Air Force should maintain air interdiction as it is currently written.

Second, the Army should purge any false expectations about AI from its doctrine. Third, division commanders should have authority to plan and direct operations throughout their battlespace. This authority should include all attack means to include close air support. Finally, the Army and the Air Force need to rewrite close air support doctrine. These changes mark the most significant lessons for air power following Operation Desert Storm.

From 1982-1994, the control of air interdiction was increasingly centralized under the JFACC. During the Gulf War, centralization and efficiency peaked in the form of air interdiction. The Gulf War Air Power Survey Summary Report concluded the following about the importance of air interdiction:

> The most important contribution of air power in the Kuwait theater during the ground war, and a prime reason why the ground campaign was so short and so overwhelming, was the success of air interdiction in preventing the heavy divisions from moving or fighting effectively.[100]

Air interdiction was an unqualified success. The Air Force and joint doctrine developed from 1992-1994 accurately delineates the procedures to conduct the air interdiction effort under the JFACC's efficient and centralized control.

Conversely, employing air interdiction at division level fragments the air effort and diminishes the effectiveness of interdiction operations. First, deep attacks under the JFACC's centralized control yield not only important operational effects but also efficiency in fuel, aircraft usage, and manpower. Second, the JFACC, as the supported commander for interdiction, controls the fight in his battlespace. Third, diverting aircraft to the division deep battle prevents the Air Force from achieving the concentration needed for the successful AI

missions. The JFC's and the JFACC's goal is to apportion air power in the proper balance relative to established strategic, operational, and tactical priorities. The order of precedence goes from strategic to operational and, finally, to tactical objectives. Consequently for air power, strategic attack and air interdiction have precedence over CAS.[101] Given the recent success of air interdiction in the Gulf War, the Army would face an impossible struggle if it truly sought to replace the concept of centralizing interdiction under the JFACC's centralized control.[102]

The Air Force has demonstrated the feasibility of its AI concept. On the other hand, the Army has false expectations concerning AI for the division deep battle.[103] The division cannot depend on AI for its division deep battle and needs to acknowledge that fact in Division Operations (1994).

Although the Air Force should maintain centralization of AI, both the Army and the Air Force need to change their conception of CAS. CAS has the capability to attack the enemy throughout the depth of the division's commander's battlespace. In Operation Desert Storm, AI and CAS sorties attacked within several miles of each other.[104] CAS and AI roles have now become blurred. The following excerpt from The New Calculus indicates there is no meanful distinction between CAS and AI.

> Because of the growing capacity to detect enemy forces at great distance, and then engage with mass, lethality, and precision, we [the RAND authors] believe the distinction between "close air support" and interdiction is becoming less meaningful. In our concept, air and land forces engage forward, rear, and transiting enemy forces more or less simultaneously.[105]

Air power can be employed throughout the depth of the battlefield. The Army envisions a similar concept in TRADOC Pam 525-5, Force XXI

Operations. Extended battle space (one of the aspects of the future conventional battlefield) echoes similar perceptions of the future battlefield. Force XXI Operations states that "recent U.S. operations show that deep battle has advanced beyond the concept of attacking the enemy's follow-on forces in a sequenced approach to shape the close battle to one of simultaneous attack to stun, then rapidly defeat the enemy.[106] Attacking throughout the battlefield requires division commanders to generate maximum combat power. CAS can be one of the division commander's essential instruments to stun and defeat the enemy. Division Operations (1994) does not reflect the extension of CAS to the limits of the division deep battle. In any future war and in the Force XXI concept, CAS will probably follow the Operation Desert Storm precedent.

To achieve synergy in joint doctrine, both the Army and the Air Force will have to change their concept for employing CAS. The Army cannot successfully integrate CAS into the division deep fight until the Air Force changes its doctrine. Likewise, if the Air Force is going to make the CAS assets available to the division, the division needs to do a better job of planning and executing the deep battle. There are several key issues. Aircraft type and terminal control are primarily Air Force issues; target intelligence is an Army issue; and joint suppression of enemy air defense (JSEAD) and battlefield integration are joint issues.

Aircraft type refers to the suitability of a particular aircraft to attack to the depths of the division deep battle. Lieutenant General McPeak, in 1985, noted that high-threat conditions "may restrict employment of our primary CAS aircraft, keeping them near the FLOT and

thus preventing their use against BAI targets."[107] General McPeak was referring to the survivability of CAS aircraft that attack targets defended by air defense systems at BAI depths. A recent case in point occurred in the Gulf War when A-10s flew sixty to seventy miles from the FLOT to attack the Republican Guard. The Iraqis shot down two aircraft the first day. The first solution was to restrict A-10 depths to within thirty miles of the FLOT to focus on the front-line divisions. Second, CENTAF air planners switched to more survivable high-performance aircraft such as the F-16s and F-15Es.[108] The Air Force must employ the proper type of CAS aircraft to survive in the threat environment. The TACP assumes an important role in directing the appropriate aircraft, especially in a "push CAS" system, to the division deep and close battles.

The next issue the Air Force must consider is terminal control. Terminal control identifies and locates the target, and thereby, improves the percentage of a successful engagement. Terminal control, General McPeak concluded, may not be possible in deep attack. Terminal control ensures identification of the target and safeguards friendly forces. Instead, he proposed the use of procedural control measures or "fast FACs".[109] The Air Force used both practices with great success during the Gulf War. Procedural control such as the "kill box" offers a good example in which air and ground forces are constrained but protected through a control measure. "Fast FACs" are a significant force multipler, and are so important that they should be distributed, similarly to CAS distribution, as a means to weight the main effort. Besides assisting CAS aircraft with the deep attack, the "Fast FACs" also report intelligence.

Intelligence support is an Army concern in developing a new CAS concept. Targeting for CAS relies completely on the division's intelligence support. The ground station module offers the potential for timely and accurate intelligence support at division level. Division must streamline the intelligence flow to improve the sensor-to-shooter linkage. Intelligence remains a critical aspect of fire support for deep operations.

The nature and density of the enemy's air defense capabilities impact significantly on JSEAD for CAS. There are three ways available to counter enemy air defenses: avoid, suppress, or destroy. The most important enemy systems are radar acquisition and tracking systems for surface-to-air missiles. The Air Force habitually attacks these high priority targets as part of the counterair battle. After the radar systems are eliminated, only optically- or infrared-guided systems remain. In this degraded air defense environment, close air support can survive and fight. In Operation Desert Storm after enemy surface-to-air missile launches were destroyed, aircraft avoided enemy air defenses by flying and attacking at 10,000 feet or higher. This medium altitude permitted the aircraft to operate in relative safety from optically-guided anti-aircraft artillery (AAA). Precisions munitions such as the Infrared (IR) or the Electro-optical (TV) Maverick permitted pinpoint attacks against ground targets from ranges averaging 3.5 miles or less.[110] These weapons provided significant standoff from enemy air defense systems and targets. After the SAM threat diminished, U.S. aircraft were able to avoid enemy weapon systems and still attack targets at deep ranges.

If aircraft cannot avoid enemy anti-aircraft systems, then those systems must be suppressed or destroyed. JSEAD frequently uses assets such as F-4G Wild Weasels (carrying antiradiation missiles), electronic attack jammers, attack helicopters, or artillery systems. Wild Weasels and jammers are scarce assets and primarily support the JFACC's interdiction operations. Divisions can, however, make attack helicopters and artillery available for JSEAD against deep targets. Conducting deep attacks with CAS requires an active division staff working closely with the TACP. The division TACP coordinates JSEAD in the same way that army aviation coordinates deep attacks for cross-FLOT attacks. In future conflicts, the Air Force's assessment of the enemy's air defense capabilities will determine the required tactics in the division's deep battle.

The Army and Air Force need to capture these issues in joint and service doctrine. Aircraft availability, terminal control, intelligence, and integrated planning for J-SEAD mark the critical issues for successful CAS employment in the next war. Agreement through joint doctrine enables training and familiarity with CAS employment in the division deep battle. The final result also produces a capable and effective division combat force.

Air support is a viable weapon throughout the depth of the division battlefield. Air support doctrine between 1982 and 1991 had attempted to provide air support in various ways in support of the Army's deep battle. Before Operation Desert Storm, the corps or army echelons centralized BAI and prevented any reliable support to the division. The Army made the corps the focal point for the deep battle and structured the Army's intelligence support accordingly. Given the

definition of BAI, the available intelligence support, and high-threat environment, Army and Air Force positions were understandable. The division had deep battle requirements, yet there were no assets to attack deep.

The Gulf War experience indicates an expanded battlefield in future wars. The division will need a multidimensional deep battle capability that includes CAS. Unfortunately, neither service nor joint doctrine has yet to capture the new reality of CAS. CAS is responsive, survivable, and effective in the division deep battle. In the new vision, decentralized planning and execution will require thorough integration and detailed preparation by division staffs. In the division's commander's battlespace, CAS provides a crucial dimension for simultaneous attack in depth.

ENDNOTES

1. Michael Howard, "Military Science in an Age of Peace," RUSI, Journal of the Royal United Services Institute for Defense Studies 119 (March 1974), p. 4.

2. Department of the Army, FM 100-5: Operations (Washington, D.C.: Department of the Army, 1982), p. 7-15. Department of the Army, FM 100-5: Operations (Washington, D.C.: Department of the Army, 1986): p. 38. Department of the Army, FM 100-5, Operations (Washington, D.C.: Department of the Army, 1993), p. 2-19. Hereafter, these documents will be referred to as "FM 100-5" followed by the year of publication in parentheses. For example, the 1982 version will be referred to as "FM 100-5 (1982)."

3. James P. Kahan, "Air Support in CENTAG's Deep Operations," Military Review 69 (August 1989), p. 73.

4. Joint Chiefs of Staff, Joint Pub 3-09: Doctrine for Joint Fire Support (Final Draft) (Washington, D.C.: Joint Chiefs of Staff, 1991), p. II-3.

5. United States Army, U.S. Readiness Command Pamphlet 525-8, General Operating Procedures for Joint Attack of the Second Echelon (J-SAK) will hereafter be referred to as "J-SAK." Air Force Manual 1-1, Basic Aerospace of the United States Air Force will be referred to as "AFM 1-1."

6. John L. Romjue, "The Evolution of the AirLand Battle Concept," Air University Review 35 (May-Jun 1984), p. 11.

7. Department of the Army, FM 100-5: Operations, 1982, p. 2-2.

8. Ibid., p. 7-11.

9. Ibid.

10. Ibid.

11. Ibid., p. 7-13.

12. Ibid., pp. 6-2, 7-15. Area of influence is the geographical area where a commander acquires and fights the enemy. Area of interest is the "territory which contains enemy forces capable of affecting future operations." The division collects information up to 72 hours away from the defended area; the territory corresponding to the enemy's location 72 hours away is the area of interest. The division fights the enemy in the last 24 hours before he reaches the FLOT; the geographical area corresponding to the enemy's location 24 hours away from the FLOT is the area of influence. Higher headquarters assign area of influence to subordinates.

13. Richard Davis, The 31 Initiatives: A Study in Army-Air Force Cooperation (Washington, D.C.: Office of Air Force History, 1987), p. 6. The spirit of cooperation alluded to by Mr. Davis is embodied in a Department of the Army/Department of the Air Force document entitled "Memorandum of Understanding on Joint USA/USAF Efforts for Enhancement of Joint Employment of the AirLand Battle Doctrine" dated 21 April 1983. As the name of the memorandum implies the impetus of the document was "to provide operational commanders the most capable, flexible and mutually enhanced mix of forces for the joint execution of the AirLand Battle against enemy forces." AirLand Battle is not USAF doctrine; the

USAF is, however, supporting AirLand Battle. This memorandum is printed as Appendix 1 of Davis' book.

14. Ibid., p. 97. This passage comes from a Department of the Army/Department of the Air Force document entitled "Memorandum of Understanding on Initiation of a Joint U.S. Army-U.S. Air Force Force Development Process" dated 2 November 1983. It is printed as Appendix 2 of Davis' book.

15. Ibid., pp. 58-59.

16. USREDCOM Pam 525-8/TRADOC Pam 525-45/TACP 50-29, General Operating Procedures for Joint Attack of the Second Echelon (J-SAK) (MacDill Air Force Base, FL: U.S. Readiness Command, 1984), p. 1-2.

17. L. D. Holder, "Maneuver in the Deep Battle," Military Review 62 (May 1982), p. 60.

18. J-SAK, p. 2-9.

19. Ibid., p. 4-1.

20. Ibid., p. 4-2.

21. United States Air Force, AFM 1-1, Basic Aerospace Doctrine of the United States Air Force (Washington, D.C.: Headquarters, United States Air Force, 1984), p. 3-4.

22. James A. Machos, "TACAIR Support for the AirLand Battle," Air University Review 35 (May-Jun 1984), pp. 23-24.

23. Merrill A. McPeak, "TACAIR Missions and the Fire Support Coordination Line," Air University Review 36 (Sep-Oct 1985): p. 69.

24. J-SAK, p. 2-8.

25. McPeak, p. 69.

26. Ibid., p. 68.

27. Ibid., p. 71.

28. Machos, p. 18.

29. FM 100-5 (1986), pp. 19-20.

30. Ibid., p. 17.

31. J-SAK, p. 2-8.

32. Kahan, p. 68, 72. The author also makes a point that BAI serves the same purpose in NATO and U.S. doctrine. The different methods of allocating BAI discussed in this paragraph do not occur because of differences in BAI's purpose.

33. FM 100-5 (1986), p. 20.

34. Kahan, p. 72.

35. Ibid.

36. Department of the Army, FM 71-100, Division Operations (Washington, D.C.: Department of the Army, 1990), p. 1-5.

37. Ibid., p. 1-6.

38. Ibid., pp. 2-17 to 2-18.

39. Ibid., p. 4-20.

40. Ibid.

41. Robert H. Scales, Certain Victory: The U.S. Army in the Gulf War (Washington, D.C.: Office of the Chief of Staff, United States Army, 1993): p. 178.

42. (S) USCENTCOM, Concept of Operations: Tactical Air Request Net, CAS, Interdiction, and ABCCC (Riyadh, Saudi Arabia: CENTAF, 1990); quoted in Eliot A. Cohen, ed., Gulf War Air Power Survey (Washington, D.C.: U.S. Government Printing Office, 1993), vol. I, Planning/Command and Control, p. 314. The JFACC eliminated BAI early in Operation Desert Shield despite the seemingly more complicated central European battlefield with eight allied corps abreast in which BAI would play a central role. Also, the 9 September decision to eliminate BAI occurred before the November decision to deploy the U.S. VII Corps.

43. Cohen 1993, I: p. 235.

44. John A. Warden III, The Air Campaign (Ft. McNair: National Defense University Press, 1988), pp. 161-2.

45. Cohen 1993, I: p. 180, 242.

46. (S) USCENTCOM, Concept of Operations: Tactical Air Request Net, CAS, Interdiction, and ABCCC (Riyadh, Saudi Arabia: CENTAF, 1991). quoted in Eliot A. Cohen, ed., Gulf War Air Power Survey, vol. I, Planning/Command and Control (Washington, D.C.: U.S. Government Printing Office, 1993), p. 101-2. This classified, original work was published by USCENTAF/DO Combat Plans on 1 January 1991. Cohen presented declassified portions that were cited in the Gulf War Air Power Survey.

47. Department of the Army, FM 100-103, Army Airspace Command and Control in a Combat Zone (Washington, D.C.: Department of the Army, 1987), p. 2-4. "Procedural control is a method of airspace control that relies on a combination of previously agreed on and promulgated orders and procedures. It is not accomplished by electronic means." In this example, procedural control is effected by an "activated" kill box, a previously agreed on procedure which permits aircraft to attack without further coordination.

48. Ibid., p. 189.

49. Conduct of the Persian Gulf War: Final Report to Congress (Washington, D.C.: U.S. Government Printing Office, 1992): p. 248.

50. Cohen 1992, I: p. 294.

51. Scales, p. 369.

52. Scales, p. 178.

53. Scales, pp. 191-2.

54. Ibid.

55. Cohen 1993, I: p. 312. Cohen cited the USCINCCENT situation reports for 23-28 February 1991 in this note.

56. Robert E. Duncan, "Responsive Air Support--Desert Shield/Storm," The Air Land Sea Bulletin (Dec 1992), p. 15.

57. Conduct of the Persian Gulf War: Final Report to Congress, p. 268.

58. Eliot A. Cohen, Gulf War Air Power Survey (Washington, D.C.: U.S. Government Printing Office, 1993), vol. II, Operations/Effects and Effectiveness, p. 216.

59. Ibid., p. 103.

60. Conduct of the Persian Gulf War: Final Report to Congress, p. 131.

61. Robert H. Scales, "Scales Papers," (Fort Leavenworth, KS: Army Historical Archives Service, 1993), Scales SG HST, W009 Doc 01-Page 17.

62. Conduct of the Persian Gulf War: Final Report to Congress, p. 272

63. (S) After Action Review, 8th Air Support Operations Group (ASOG), Operations Desert Shield/Storm, 6 December 1991; quoted in Cohen 1993, I: 320.

64. Robert H. Scales, "Scales Papers," (Fort Leavenworth, KS: Army Historical Archives Service, 1993), Scales SG UH, ABC-023 Doc 01-p. 58.

65. Rick Atkinson, Crusade: The Untold Story of the Persian Gulf War (New York: Houghton Mifflin Company, 1993), p. 219.

66. 7th ACCS (ABCCC)/TACC Liaison Officer Log, 1521Z, 3 Feb 91; referenced in Cohen 1993, I: p. 319.

67. Thomas A. Keaney and Eliot A. Cohen, Gulf War Air Power Survey Summary Report (Washington, D.C.: U.S. Government Printing Office, 1993): p. 16, 21, 24.

68. Cohen 1993, I: pp. 247-8.

69. Colonel William A. Scott, interview by Brian W. Jones, January 1992, Hill Air Force Base, Utah; quoted in Brian W. Jones, "Close Air Support: A Doctrinal Disconnect," Airpower Journal 6 (Winter 1992), p. 64.

70. Jones, p. 64.

71. Norman Friedman, Desert Victory: The War for Kuwait (Annapolis, MD: Naval Institute Press, 1991), p. 175.

72. Cohen 1993, I: p. 106.

73. Scales, Certain Victory, p. 168.

74. Ibid., p. 371.

75. Conduct of the Persian Gulf War: Final Report to Congress, pp. 723-724.

76. Cohen 1993, I: p. 380.

77. United States Air Force, AFM 1-1, Basic Aerospace Doctrine of the United States Air Force, vol. II, (Washington, D.C.: Headquarters, United States Air Force, 1992), pp. 105-106.

78. United States Air Force, AFM 1-1, Basic Aerospace Doctrine of the United States Air Force, 1992, vol. I (Washington, D.C.: Headquarters, United States Air Force, 1992), p.6.

79. Joint Chiefs of Staff, Joint Pub 1-02: Department of Defense Dictionary of Military and Associated Terms (Washington, D.C.: Joint Chiefs of Staff, 1994), pp. 16, 70. CAS and AI are defined in this publication; there is no reference to BAI.

80. Joint Chiefs of Staff, Joint Pub 3-0: Doctrine for Joint and Unified Operations (Washington, D.C.: Joint Chiefs of Staff, 1993), p. IV-22.

81. Joint Chiefs of Staff, Joint Pub 3-09: Doctrine for Joint Fire Support (Final Draft), p. I-2.

82. The Air Land Sea Application Center, The Theater Air Ground System (TAGS) (Final Draft) (Langley Air Force Base, VA: The Air Land Sea Application Center, 1993), pp. II-7 to II-8.

83. "Once the target development is complete, weaponeering determines the type and number of aircraft and munitions, proper fusing, and aim point to achieve the desired effect." The Air Land Sea Application Center, The Theater Air Ground System, p. VIII-9.

84. Joint Chiefs of Staff, Joint Pub 3-56.1: Command and Control for Joint Air Operations (Second Draft) (Washington, D.C.: Joint Chiefs of Staff, 1993), pp. IV-4 to IV-6. Apportionment assigns a percentage of the total effort to the various air operations. For example: air superiority-25%; strategic attack-15%; air interdiction-40%; CAS-20%. Allocation translates apportionment into total numbers of sorties by type for each operation/task. For 600 total sorties are available, 25%, or 150 sorties, would conduct air superiority.

85. Joint Chiefs of Staff, Joint Pub 3-09: Doctrine for Joint Fire Support, p. I-1.

86. Ibid., p. I-14.

87. The Air Land Sea Application Center, The Theater Air Ground System (TAGS) (Final Draft), p. III-43.

88. Joint Chiefs of Staff, Joint Pub 3-09.3: Joint Tactics, Techniques, and Procedures for Close Air Support (First Draft) (Washington, D.C.: Joint Chiefs of Staff, 1994), p. IV-6.

89. Ibid., pp. IV-6 to IV-7.

90. Ibid., pp. I-9 to I-12.

91. Ibid., pp. I-5 to I-6.

92. Department of the Army, FM 100-5, Operations, pp. 2-7 to 2-8.

93. Department of the Army, FM 71-100, Division Operations (Initial Draft) (Washington, D.C.: Department of the Army, 1994), p. 2-22.

94. Ibid., p. 1-46.

95. Ibid.

96. Ibid., p. 1-47.

97. Douglas M. Carlson, "Joint STARS, Success in the Desert, What Next?" The Air Land Sea Bulletin 92-2 (June 1992), pp. 13-14.

98. Martin S. Kleiner, "Joint STARS Goes to War," Field Artillery (February 1992), p. 26.

99. Jerry R. Rutherford, "Shaping the Battlefield--Deep Operations in V Corps," Field Artillery (April 1993), p. 8.

100. Keaney and Cohen, p. 116.

101. Benjamin F. Cooling, Case Studies in the Development of Close Air Support (Washington, D.C.: Office of Air Force History, 1990), p. 554. Cooling states that this same precedence of priorities (air superiority, air interdiction, and close air support) was adopted in 1939 by the German Luftwaffe and in 1973 by the Israeli Air Force.

102. Art Breithaupt and others, "Close Air Support: Who Should Do It?," The Air Land Sea Bulletin 93-3 (September 1993), p. 7.

103. Douglas P. Scharre and William S. McCallister, "CAS in the Deep Fight," The Air Land Sea Bulletin 93-1 (March 1993), p. 6. The authors explain their frustration with AI during a Battle Command Training Program Warfighter exercise with the Second Infantry Division. Problems arose because: (1) of AI's unresponsiveness because of the lengthy nomination process; and (2) of AI's unreliability because the division had no guarantee that its targets were approved or attacked.

104. Keaney and Cohen, p. 116.

105. Christopher Bowie and others, The New Calculus: Analyzing Airpower's Changing Role in Joint Theater Campaigns (Santa Monica, CA: RAND, 1993), p. 52.

106. Department of the Army, TRADOC Pam 525-5, Force XXI Operations (Fort Monroe, VA: U.S. Training and Doctrine Command, 1994), p. 2-9.

107. McPeak, p. 70.

108. Rick Atkinson, Crusade: The Untold Story of the Persian Gulf War (New York: Houghton-Mifflin Company, 1993), pp. 312-314.

109. McPeak, p. 70.

110. Conduct of the Persian Gulf War: Final Report to Congress, p.778.

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